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A REVISION OF THE CIS-MISSISSIPPI TERTIARY PECTENS OF THE UNITED STATES.

BY ANGELO HEILPRIN.

In the accompanying notes the author has attempted to give a complete list of all the *Pecten*s thus far described from the tertiary deposits of the United States east of the Mississippi River, indicating, as far as possible, their range in time and their geographical distribution. The rather hap-hazard method in which the tertiary palæontology of a great portion of the United States has thus far been treated has rendered the statement of this last a matter of great difficulty, and doubtless the range, both in time and space, of many of the species herein enumerated, will require emendation when more accurate data will have been brought directly from the field itself.

The titles of the various works quoted are indicated by the following abbreviations:—

J. A. N. S.	Journal of the Academy of Natural Sciences of Phila.
Proc. A. N. S.	Proceedings of the Academy of Natural Sciences.
A. J. Science.	American Journal of Science and Arts.
A. J. Conchol.	American Journal of Conchology.
Mioc. Foss.	Conrad's "Fossils of the Medial Tertiary of the United States."
Syn. Org. Rem.	Morton's "Synopsis of the Organic Remains of the Cretaceous Group."
Plioc. Foss.	"Pleiocene Fossils of South Carolina," by Tuomey and Holmes.

The generic names placed in parentheses indicate the names under which the given species appear in the "Smithsonian Check Lists" of 1864 and 1866.

EOCENE.

P. anisopleura Conr.	N. Car.
Kerr, "Geol. Survey of North Carolina," 1875, Appendix, p. 18.	
P. calvatus Mort. (Camptonectes)	S. Car.
Syn. Org. Remains, p. 58 (<i>Jacksonian</i>).	
P. Carolinensis Conr.	N. Car.
Kerr, "Geol. Survey of North Carolina," 1875, Appendix, p. 18.	
? P. Claibornensis Conr. (Camptonectes).	Ala.
Smithsonian Check List, 1866.	

I have been unable to discover the description of this species. A specimen with this name in the Academy's collection, and marked in Conrad's handwriting, scarcely admits of positive specific determination. It has been considerably eroded, and appears as though it may have been either closely related to, or identical with *P. calvatus* (Mort.).

P. Deshayesii Lea.

Ala.

"Contributions to Geology," p. 87.

P. Lyelli Lea. "Contr. to Geol.," p. 88 (young).

Both of Lea's figured specimens are in the Academy's collection, and show beyond doubt that they belong to one and the same species, what there is of *P. Lyelli* corresponding precisely to the earlier formed portion of *P. Deshayesii*. This last must be carefully distinguished from the *P. Deshayesii* of Nyst ("*Coqu. et Polyp. Foss.*," p. 288), which was founded on the erroneous supposition that Lea's species was only a variety of *P. opercularis*, Lam.; a new specific name should therefore be given to the Belgian *Pecten*.

P. elixatus Conr. (Janira), *Jacksonian*?

S. Car..

Proc. A. N. S., ii, p. 174.

P. Knieskerni Conr.

N. J..

A. J. Conchol., v, p. 40 (described from a cast).

P. membranosus Mort. *Jacksonian*.

Ala.; S. Car.; N. Car.

Syn. Org. Rem., p. 59.

P. nuperus Conr. *Jacksonian*.

Miss..

Proc. A. N. S., vii, p. 259.

P. scintillatus Conr. (Camptonectes).

Miss.

A. J. Conchol., i, p. 140, as *Eburneopecten*.

OLIGOCENE.

P. anatipes Mort.

Ala.

Syn. Org. Rem., p. 58.

P. perplanus Mort.

Ala.; Miss.

Syn. Org. Rem., p. 58.

P. Spillmani Gabb. J. A. N. S., 2d series, iv, p. 402.

The original specimen of *P. Spillmani* in the Academy's collection agrees thoroughly with *P. perplanus*, and is marked as its equivalent in Gabb's handwriting.

P. Poulsoni Mort. (Janira).

Ala.; Miss.

Syn. Org. Rem., p. 59.

MIOCENE.

P. biformis Conr.

Va.

Proc. A. N. S., i, p. 306. Mioc. Foss., p. 73.

This species appears at first sight to be closely related to the *P. Danicus* of Chemnitz, from which, however, it can be readily distinguished by the profound notch under the ear of the right valve, the greater concavity of the opercular valve, and the more prominent and irregular lines on the inferior moiety of the ribs of the convex valve.

P. cerinus Conr.

Md.

A. J. Conchol., v, p. 39.

P. comparilis Tuomey and Holmes.

Va.; N. Car.

Plioc. Foss., p. 29.

P. eboreus Conr. (in part).= Specimen marked by Conrad as *P. Yorkensis*.*P. micropleura* (young) H. C. Lea. Transactions Am. Philosoph. Society, ix, p. 245.

The specimens which constitute the *P. comparilis* of Tuomey and Holmes were included by Conrad in his *P. eboreus*, but the two can be readily distinguished from each other in the character of the ribs, which in *P. comparilis* are considerably more elevated, and much more distinctly marked off from the general surface of the valve. I have retained as the type of Conrad's *P. eboreus* the forms agreeing with the figure in the "Fossils of the Medial Tertiary of the United States." The *P. comparilis* bears in many respects a close resemblance to *P. purpuratus* Lam., from the coast of Peru, but it may be easily distinguished by the ribs in the interior faces of the valves passing prominently to the umbonal region, whereas in *P. purpuratus* they become indistinct a short distance from the margin, and appear, moreover, much broader. *P. comparilis* is, again, less ventricose on the umbonal region, but more convex toward the basal margin. The intermediate scaly rib between the principal ones present in *P. purpuratus* is wanting in *P. comparilis*. The ears are in *P. comparilis* less prominently marked by the radiating lines.

P. decemnarius Conr.

Va.

J. A. N. S., vii, p. 151. Mioc. Foss., p. 49.

P. dispalatus Conr.

Va.

Mioc. Foss., 74.

P. eboreus Conr.

Va.; N. Car.

A. J. Science, xxiii, p. 341. Mioc. Foss., p. 48.

P. Holbrooki Rav. Proc. A. N. S., ii, p. 96.

Two species were included by Conrad under this name, the second being the one subsequently described by Tuomey and Holmes as *P. comparilis*.

P. Edgecombensis Conr.

N. Car.

Proc. A. N. S., 1862, p. 291. Not figured.

The species is described from a specimen in the Smithsonian Institution which I have not had an opportunity to examine.

P. fraternus Conr.

Va.

Proc. A. N. S., 1862, p. 291.

? *P. tricarinatus* Conr. A. J. Conchol., iii, p. 189.

I have not seen a specimen of *P. fraternus*, but its specific description accords well with the specimen marked in Conrad's handwriting *P. tricarinatus*, which I have good reason to believe is the very specimen from which the description of *P. fraternus* has been taken.

P. Humphreysii Conr. (*Oligocene*?).

Md.; N. J.

Proceedings of the National Institution, p. 194.

The convex valve of the average specimens of this species very closely approximates the recent *P. laqueatus* of Sowerby ("Thesaurus Conchyliorum," i, p. 46), from the northwest coast of America, both in outline and ornamentation, but differs in the lesser number (only six instead of eight), lesser prominence, and greater irregularity of the ribs, which also spread out broader towards the basal margin. The valve is, moreover, considerably less ventricose than in *P. laqueatus*. I have been unable to make any comparisons between the opercular valves.

P. Jeffersonius Say.

Md.; N. Car.; Va.

J. A. N. S., iv, p. 133. Conrad, Mioc. Foss., p. 46.

P. Madisonius Say.

Md.; N. Car.; Va.

J. A. N. S., iv, p. 134. Conrad, Mioc. Foss., p. 48.

P. Magellanicus Gmelin.

Md.; N. Car.; Va.

Syst. Nat., 3317.

P. Clintonius Say. J. A. N. S., iv, p. 135.*P. princepoides* Emmons. N. Car. Geol. Surv., 1858, p. 280.

I have compared both young and old specimens of the *P. Clintonius* with those of *P. Magellanicus*, and have no hesitation in

stating that they all belong to but one species. Some of the fossil specimens do not differ nearly as much from the recent one as the individual specimens of the latter do among themselves. The statement of Say that the sides of the shell (*P. Clintonius*) below the auricles slope much more rapidly downwards than in *G. Magellanicus* is erroneous; nor is there any appreciable difference in the character of the radiating striæ.

P. Peedeënsis Tuomey and Holmes.

N. Car.

Plioc. Foss., p. 30. (See *P. Peedeënsis* under **PLIOCENE**).

The only authority I have (in addition to the statement of Emmons) for stating that this species is found in the Miocene deposits of North Carolina rests on an examination of one solitary valve of a specimen marked by Conrad *P. (Liropecten) Carolinensis* (described in Kerr's Geol. Rep. of North Carolina, Appendix, p. 18), which, as far as I have been able to determine, does not differ essentially from the *P. Peedeënsis* of Tuomey and Holmes. The specific name, *Carolinensis*, is preoccupied by an Eocene species.

P. Rogersi Conr.

Va.

J. A. N. S., vii, p. 151. Mioc. Foss., p. 45.

P. septemnarius Say.

Md.; Va.

J. A. N. S., iv, p. 136. Conr., Mioc. Foss., p. 47.

I am inclined to believe that this species will be found to be a mere variety of *P. Jeffersonius* Say; want of a sufficient number of specimens with which to make the comparison has prevented me from making a positive determination.

?**P. tricarinatus** Conr.

Va.

A. J. Conchol., iii, p. 189.

= *P. fraternus*? Conr. (See *P. fraternus*.)

P. tricenarius Conr.

Va.

Proc. A. N. S., i, p. 306. Mioc. Foss., p. 74.

P. vicanarius Conr.

N. Car.

Proc. A. N. S., i, p. 306.

Closely related to *P. comparilis* T. & H.

P. Virginianus Conr.

Va.

Mioc. Foss., p. 46.

P. tenuis H. C. Lea. Trans. Am. Philos. Soc., ix, p. 246.

Mr. Searles Wood ("British Crag Mollusca," Bivalves, p. 25. Palæont. Soc. Reports, 1856), states that this shell somewhat

resembles the *P. Gerardii* of Nyst, found in the Coralline Crag of England, but that it differs among other characters in being broader than high, and in having the auricles more developed. I have compared Conrad's specimens with Wood's figure, and find the statement concerning the ears to be correct; the relative dimensions of the shell are, however, not constant.

PLIOCENE.

I have adopted Tuomey's determination of the South Carolina post-Eocene deposits, there being as yet not sufficient evidence to prove that they are of Miocene age, as insisted upon by Conrad.

P. affinis Tuomey and Holmes. S. Car.
Plioc. Foss., p. 26.

I have seen no specimens of this species.

P. comparilis Tuomey and Holmes. S. Car.
Plioc. Foss., p. 29.

P. eboreus Conr. S. Car.
Mioc. Foss., p. 48.
Tuomey and Holmes, Plioc. Foss., p. 28.

P. hemicyclus (Rav.?) Tuomey and Holmes. S. Car.
Plioc. Foss., p. 25 (name quoted from Ravenel).

The opercular valve of this species is of the exact outline, and very much the appearance of the similar valve of *P. excavatus* Sowerby (= *P. Sinensis?*), but is considerably less concave. It is of the shape and concavity of *P. Jacobæus*, but with more numerous ribs. The right valve is less convex than in *P. excavatus*, and wanting on its ribs the prominent lines found in *P. Jacobæus*.

P. Marylandicus Wagner. N. Car.
J. A. N. S., viii, p. 51, Pl. 1, fig. 2 (very poorly figured).

Described from the Pliocene of North Carolina, but more probably Miocene.

This species very closely resembles in form, texture and ornamentation *P. Islandicus* Müll., but is less prominently ribbed, especially on the ears (where the ribs are also more numerous).

P. Mortoni Ravenel (Amussium). S. Car.
Proc. A. N. S., ii, p. 96.

This species differs from the *P. Japonicus* Gmel., in its larger size, thinner texture, and in having the internal ribs arranged in

a series of much narrower pairs, i. e., the two ribs of each pair are set closer to each other, and the intervening spaces between the individual pairs is very much greater. The supposed distinction pointed out by Tuomey and Holmes that the number of ribs in *P. Mortoni* is less than in *P. Japonicus*—namely, forty, whereas in the latter, it is forty-six—does not hold, since the number in *P. Japonicus* is very variable even in the valves of the same individual, one specimen showing thirty-four in one valve, and forty-four in the other.

P. Peedeënsis Tuomey and Holmes.

S. Car.

Plioc. Foss., p. 80.

P. (Liropecten) Carolinensis Conr. (Kerr's Geol. Report of North Carolina, Appendix, p. 18), appears to be but a variety of this species, having more ribs (twelve).

This species is stated by Tuomey and Holmes to be "very closely related to, if not identical with *P. nodosus* of the Gulf of Mexico." It appears to me that the resemblance exists only in the fact of the ribs in both species being knobbed, broken into nodes, otherwise the ornamentation is very distinct, the very prominent radiating ridges on and between the ribs in *P. nodosus* being wanting in *P. Peedeënsis*, where they are replaced by fine impressed lines.

P. septemnarius Say.

S. Car.

J. A. N. S., iv, p. 36. Conr., Mioc. Foss., p. 47.

Tuomey and Holmes, p. 31.

P. Jeffersonius var. ?

Pecten dislocatus Say, is described from the post-Pliocene deposits of South Carolina by Holmes ("Post-Pliocene Fossils of South Carolina," p. 12), and specimens of *P. hemicyclus* from the same deposits, are in the collections of the Academy. Specimens of *P. irradians* Linn., distinctly showing the color marks, also occur in the newer formations, but I have been unable to determine the locality or localities whence they have been obtained.